NSDHL gene

NAD(P) dependent steroid dehydrogenase-like

Normal Function

The *NSDHL* gene provides instructions for making an enzyme that is involved in the production (synthesis) of cholesterol. Cholesterol is a lipid (fat) that is obtained from foods that come from animals, particularly egg yolks, meat, fish, and dairy products. The body can also make (synthesize) its own cholesterol. During cholesterol synthesis, the NSDHL enzyme participates in one of several steps that convert a molecule called lanosterol to cholesterol. Specifically, the NSDHL enzyme removes a carbon atom and three hydrogen atoms (a methyl group) in the conversion of lanosterol to cholesterol.

Although high cholesterol levels are a well-known risk factor for heart disease, the body needs some cholesterol to develop and function normally. Before birth, cholesterol interacts with signaling proteins that control early development of the brain, limbs, genital tract, and other structures. It is also an important component of cell membranes and myelin, the fatty covering that insulates nerve cells. Additionally, cholesterol is used to make certain hormones and is important for the production of acids used in digestion (bile acids).

Health Conditions Related to Genetic Changes

Congenital hemidysplasia with ichthyosiform erythroderma and limb defects

At least 18 mutations in the *NSDHL* gene have been found to cause congenital hemidysplasia with ichthyosiform erythroderma and limb defects (CHILD syndrome). Most of these mutations change single protein building blocks (amino acids) in the NSDHL enzyme. A few other mutations delete part or all of the *NSDHL* gene. Each of the identified mutations likely prevents the production of any functional NSDHL enzyme, which disrupts the normal synthesis of cholesterol within cells. A shortage of this enzyme may also allow potentially toxic byproducts of cholesterol synthesis to build up in the body's tissues. Researchers suspect that low cholesterol levels and/or an accumulation of other substances disrupts the growth and development of many parts of the body. It is not known, however, how a disturbance in cholesterol synthesis leads to the specific features of CHILD syndrome.

Other Names for This Gene

- H105E3
- NSDHL_HUMAN
- SDR31E1
- Sterol-4-alpha-carboxylate 3-dehydrogenase, decarboxylating
- XAP104

Additional Information & Resources

Tests Listed in the Genetic Testing Registry

- Tests of NSDHL (https://www.ncbi.nlm.nih.gov/gtr/all/tests/?term=50814[geneid])

Scientific Articles on PubMed

- PubMed (https://pubmed.ncbi.nlm.nih.gov/?term=%28NSDHL%5BTIAB%5D%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+3600+days%22%5Bdp%5D)

Catalog of Genes and Diseases from OMIM

- NAD(P)H STEROID DEHYDROGENASE-LIKE PROTEIN (https://omim.org/entry/300275)

Gene and Variant Databases

- NCBI Gene (https://www.ncbi.nlm.nih.gov/gene/50814)
- ClinVar (https://www.ncbi.nlm.nih.gov/clinvar?term=NSDHL[gene])

References

- Bornholdt D, König A, Happle R, Leveleki L, Bittar M, Danarti R, Vahlquist A, Tilgen W, Reinhold U, Poiares Baptista A, Grosshans E, Vabres P, Niiyama S,Sasaoka K, Tanaka T, Meiss AL, Treadwell PA, Lambert D, Camacho F, Grzeschik KH. Mutational spectrum of NSDHL in CHILD syndrome. J Med Genet. 2005 Feb;42(2): e17. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/15689440) or Free article on PubMed Central (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1735983/)
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- König A, Happle R, Bornholdt D, Engel H, Grzeschik KH. Mutations in the NSDHL gene, encoding a 3beta-hydroxysteroid dehydrogenase, cause CHILD syndrome. Am JMed Genet. 2000 Feb 14;90(4):339-46. Review. Citation on PubMed (https://pubmed.ncbi.nlm.nih.gov/10710235)
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Genomic Location

The *NSDHL* gene is found on the X chromosome (https://medlineplus.gov/genetics/chromosome/x/).

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